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GB 2027892 A GB 1243096 A

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(54) Deceleration Indicator

(57) The deceleration indicator gives a visual display of progressive braking force using a plurality of lights 12 on a support 10 connected to an inertia detector 15. The detector 15 includes, in a preferred embodiment, a light dependent resistor, a light source 22 and a shutter plate 24 pivotally located between the resistor and the source 22. A tapered slot 26 in the plate will cause a variance in the amount of light falling on the resistor depending on the inertial displacement of the plate 24 relative to the vehicle during braking thereof.

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Fig. 1

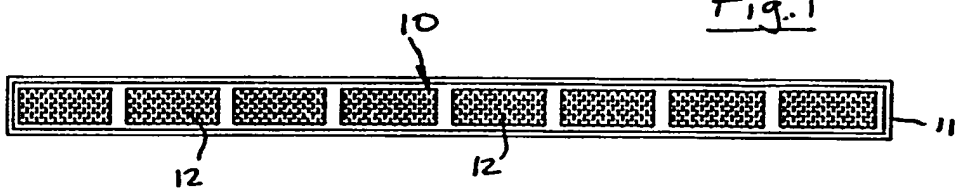
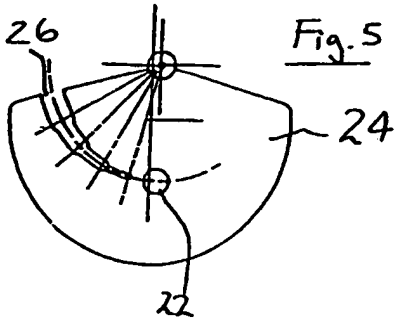


Fig. 5



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The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

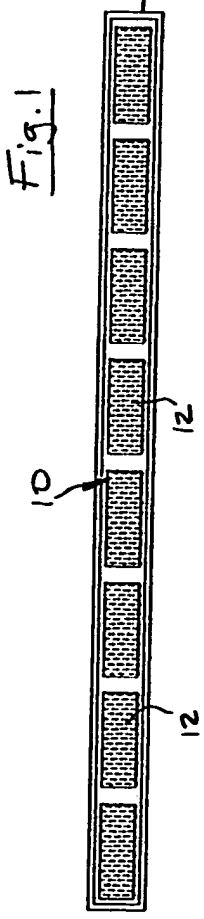

Fig.1

Fig.2

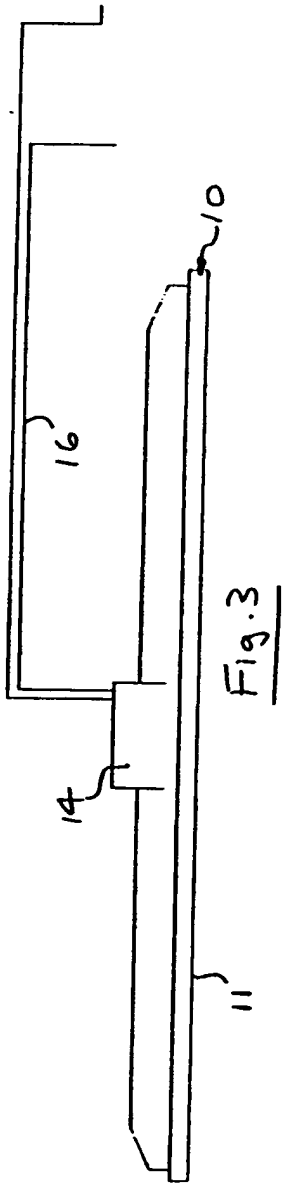

Fig.3

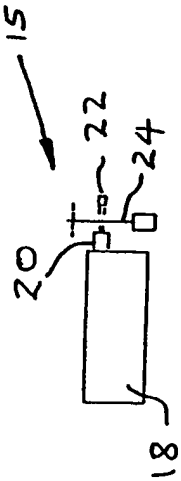

Fig.4

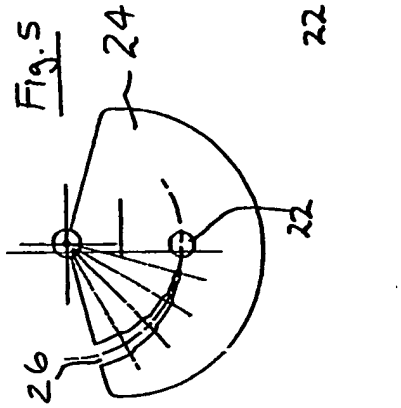

Fig.6

Fig.5

DECELERATION INDICATOR

This invention relates to a deceleration indicator especially such an indicator arranged to give a visual indication of the amount of braking force applied to a motor vehicle.

Most motor vehicles of one form or another and especially vehicles intended for use on public highways are provided with brake lights which are activated by use of the vehicle's brakes. In this way a second motor vehicle following the first can be warned of the application of brakes and hence deceleration of the first vehicle.

Such lights are commonly one or more light arrays, usually provided with a red filter or cowling, provided at the rear of the vehicle. Additionally it is also common to provide additional "high level" brake lights arranged, for example, in the rear window of a motor vehicle. Such additional lights are intended to be more easily noticeable to following vehicles, particularly a second or third vehicle who would be able to see activation of the brake lights through the windows of a first vehicle.

One problem with such arrangements is that no indication is given of the extent of brake use, the lights simply being actuated in an on/off arrangement. Thus, it is not possible for a following vehicle to gauge, from the lights alone, the extent to which the leading vehicle is decelerating. An erroneous judgement of the extent of deceleration of a leading vehicle could lead to a late application of brakes on the following vehicle and hence the possibility of a collision. In order to reduce such a possibility it would be an advantage to provide a brake light display which gave an indication as to the amount of braking force applied to the motor vehicle carrying the display.

With this object in view the present invention provides a deceleration indicator comprising a display provided with a plurality of individual lights, the lights being connected to control means which are operative to measure the decrease in speed of a motor vehicle which carries the indicator, the plurality of lights being illuminated in succession with a predetermined ratio between percentage of lights illuminated in the indicator and the measured rate of decrease of the vehicle's speed.

Preferably the control means is an inertia detector which is progressively activated by deceleration of the motor vehicle to which the indicator is attached.

In a preferred embodiment of the invention the inertia detector is a pendulum arranged in proximity to the detection means, which are operative to sense movement of the pendulum and provide a control signal proportional to the movement thereof, the control signal being supplied to the indicator and illuminating a proportion of the plurality of lights corresponding to the rate of change of the vehicle's speed.

Advantageously the sensing means is a light sensor which may be, at least, partially obscured by the pendulum such that the amount of light received is proportional to the displacement of the pendulum. Such an arrangement could comprise, for example, a disc, having a slot, the slot widening or respectively tapering at one end. The plate is pivotally mounted so as to act as a pendulum and a beam of light is shone through the slot, the light being arranged to fall on a light sensor. It will thus be appreciated that as the plate is displaced about its pivot the amount of light passing through the slot and received by the sensor will increase or decrease depending on the direction of movement of the plate with respect to the tapered slot.

Alternatively the sensing means could be a magnetic sensor or a variable resistor actuated by movement of the pendulum. Such detectors all sense progressive inertia and the switching is selective and progressive as opposed to a simple on/off switch.

In an alternative embodiment of the invention, the control means is attached to hydraulic braking system such that the hydraulic pressure within the system itself serves to provide the necessary control signal. A further alternative would be to connect the control means to the vehicle's suspension.

In order to provide a particularly striking visual display of progressive braking it is preferably to provide a plurality of lights, for example, eight lights, the lights being illuminated to represent approximately 25% braking force for each light, the control signal being operative to illuminate lights at each end of the array initially and adjacent lights thereafter such that the light array appears to close towards its centre point. Alternatively lights at the centre of the array may be illuminated initially with the highest array apparently expanding sequentially outwards from its centre.

The invention will be described further by way of example with reference to the accompanying drawings in which:

Fig. 1 is a front view of a deceleration indicator according to the first aspect of the invention;

Fig. 2 is a side view of the light indicator shown in Fig. 1;

Fig. 3 is a plan view of Fig. 1;

Fig. 4 is a diagrammatic view of an inertia detector

according to the first aspect of the invention; and

Fig. 5 and Fig. 6 are diagrammatic side views of a pendulum and shutter plate for use with a first aspect of the invention.

Turning firstly to Fig. 1, a deceleration indicator according to the first aspect of the invention is referred to generally by the reference numeral 11 and comprises a support member 10 carrying eight light filaments enclosed in transparent red housings 12. Thus, when each filament is electrified the light generated will be visible through the red housing thereby giving a plurality of red lights. As can be seen in Fig. 2, the support member 11 is substantially planar in configuration with a housing 14 projecting from the rear of the member 11. This housing 14 can be seen more clearly in Fig. 3 and serves to hold an inertia detector thus provided a self-contained unit operative to detect deceleration of a motor vehicle to which the indicator 10 is attached.

As can also be seen from Fig. 3 the inertia detector is provided with two leads 16 which operatively connect the inertia detector to the motor vehicle's internal electric circuitry. In this way the inertia detector can draw sufficient power for operation from the vehicle's battery. Such connection could be, for example, to the brake light circuit which would normally be in close proximity to the optimum positioning of the deceleration indicator according to the invention.

In Fig. 4, an inertia detector 15 according to the invention is shown in more detail. The detector 15 comprises control means 18 including an electronic lamp driver circuit with voltage dependent triggers to operate the plurality of light filaments 12 according to a predetermined sequence. The activator for the electronic lamp driver circuit is a light

dependent resistor 20 connected to the circuit. The resistor 20 receives light from a light source 22 which is powered by the motor vehicle's own circuitry.

A shutter plate 24 is disposed between the light source 22 and the light dependent resistor 20 and so as to be pivotally moveable therebetween. The shutter plate 24 is provided with a slot 26 which can be seen more clearly in Figs. 5 and 6. This slot 26 is arranged to taper from one open end of the slot coterminous with an edge of the shutter plate towards the centre of the plate. In this way the amount of light which passes through the slot will vary according to the positioning of the shutter plate 24.

As the shutter plate 24 is pivotally mounted, deceleration of a motor vehicle otherwise travelling at a constant speed will cause an inertial movement of the plate 24. Thus, the plate will move from its normal rest position (Fig. 5) to a displaced position (Fig. 6). In this displacement position, light from the light source 22 is permitted through the slot to strike the light dependent resistor. The light dependent resistor generates a signal for the control means which signal is dependent on the amount of light falling thereon and as a consequence illuminates a predetermined number of lights 12 on the indicator. More severe braking of the motor vehicle will result in a larger movement of the shutter plate 24 and hence a greater amount of light passing through to the light dependent resistor.

The invention is not confined to the foregoing details and variations may be made thereto. For example, the inertia detector need not be the shutter plate and light dependent resistor as indicated but could be any other form of light sensor. A magnetic positional sensor including receptors, such as reed switches could also be used or some form of variable resistance measurement. Alternatively the inertia detector could be dispensed with altogether and the sensor

means according to the invention could be provided by a pressure sensor linked to a hydraulic brake circuit. A further alternative would be a direct linkage to the vehicle's suspension or to the brake pedal movement. However, these latter options are limited according to the particular model of vehicle to which the indicator is to be fitted and a self-contained arrangement is to be preferred.

Further, the number of lights to be used can be varied according to the physical characteristics e.g. width of the vehicle as can the sequence of illumination according to the available space and the required operating characteristics. Repeater units i.e. multiple displays each illuminated according to the same sequence could also be provided where indication of braking force are required at different locations within or around a motor vehicle. Other variations are also possible.

CLAIMS

1. A deceleration indicator comprising a display provided with a plurality of individual lights, the lights being connected to control means which are operative to measure the decrease in speed of a motor vehicle which carries the indicator, the plurality of lights being illuminated in succession with a predetermined ratio between percentage of lights illuminated in the indicator and the measured rate of decrease of the vehicle's speed.

2. An indicator as claimed in claim 1 in which the control means is an inertia detector which is progressively activated by deceleration of the motor vehicle to which the indicator is attached.

3. An indicator as claimed in claim 2 in which the inertia detector is a pendulum arranged in proximity to sensing means which are operative to sense movement of the pendulum and provide a control signal proportional to the movement thereof, the control signal being supplied to the indicator and illuminating a proportion of the plurality of lights corresponding to the rate of change of the vehicle's speed.

4. An indicator as claimed in claim 3 in which the sensing means is a light sensor which is at least partially obscured by the pendulum such that the amount of light received is proportional to displacement of the pendulum.

5. An indicator as claimed in claim 4 in which the pendulum is a disc, having a slot, the slot widening or respectively tapering at one end, and the disc being pivotally mounted to act as the pendulum and having a beam of light arranged to shine through the slot and fall on a light sensor.

6. An indicator as claimed in claim 1, 2 or 3 in which the sensing means is a magnetic sensor or variable resistor actuated by movement of the pendulum.

7. An indicator as claimed in claim 1 in which the control means is attached to a vehicle's hydraulic braking system such that the hydraulic pressure within the system itself serves to provide the necessary control signal.

8. An indicator as claimed in any preceding claim in which the plurality of lights comprises eight lights which are individually illuminated to represent approximately 25% braking force for each light, the control signal being operative to illuminate lights at each end of the array initially and adjacent lights thereafter such that the light array appears to close towards its centre point.

9. An indicator substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number
GB 9116726.2

Relevant Technical fields

(i) UK Cl (Edition K) G1K

(ii) Int Cl (Edition 5) G10P, G01C

Search Examiner
T S SUTHERLAND

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search
30 SEPTEMBER 1992

Documents considered relevant following a search in respect of claims 1-8

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2027892 A (VDO) see page 1 lines 81 to 123	1
X	GB 1243096 (COAST LINES) see figure 1	1,2

Category	Identity of document and relevant passages	Rele .t to claim(s)

Categories of documents

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